

REMARKS

This Voluntary Amendment is submitted in response to the outstanding Advisory Action, dated September 23, 2008. The present application was filed on September 12, 2003 with claims 1 through 29. Claims 30-35 were added in the Voluntary Amendment dated October 3, 2007. Claims 1 through 35 are presently pending in the above-identified patent application.

This amendment is submitted pursuant to 37 CFR §1.116 and should be entered. In particular, the amendment deletes a statement in the Introduction section of the Detailed Description. The Amendment places all of the pending claims, i.e., claims 1 through 35, in a form that is believed allowable, and, in any event, in a better form for appeal. It is believed that examination of the pending claims as amended, which are consistent with the previous record herein, will not place any substantial burden on the Examiner. In any case, a Request for Continued Examination is being submitted herewith.

In the present Office Action, the Examiner objected to the amendment filed on October 3, 2007 under 35 U.S.C. §132(a) because it introduces new matter into the disclosure and rejected claims 1, 20, and 29-35 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner rejected claims 1-35 under 35 U.S.C. §101 for nonstatutory subject matter, and rejected claims 1-17, 20-26, and 29-35 under 35 U.S.C. §102(b) as being anticipated by Floratos, "DELPHI: A Pattern-based Method for Detecting Sequence Similarity."

Formal Objections

The Examiner objected to the amendment filed on October 3, 2007 under 35 U.S.C. §132(a) because it introduces new matter into the disclosure. In particular, the Examiner asserts that, by crossing out the word "abstract," the Applicant is introducing problems that are both "abstract" and other domains as well (page 3, lines 16-26). The Examiner asserts that pages 2-3 describe applications which are not based in an "abstract problem" solving domain which was presented in the original specification.

Applicants note that the original disclosure teaches that "the abstract problem of discovering permutation patterns is formed as a discovery problem." (Page 4, lines 7-10.) The adjective "abstract" referred to the "problem of discovering permutation patterns." Contrary to the Examiner's assertions, the adjective "abstract" did *not refer to the domains to which the*

discovery of permutation patterns applied nor to the disclosed invention. The Examiner, however, is attempting to utilize this statement as evidence that the invention is directed to non-statutory subject matter. The Examiner is also attempting to use the deletion of the statement, as evidence that the invention is directed to non-statutory subject matter. This is contradictory: if the statement is the cause for introduction of the alleged “abstract problems,” then the deletion of the statement will remove the alleged “abstract problems” from consideration.

A person of ordinary skill in the art would also recognize that the claimed invention is applicable to many domains, including those cited by the Examiner (as described on pages 2-3).

Furthermore, the present disclosure teaches that:

It is to be understood that these and other embodiments and variations shown and described in the examples set forth above and the figures herein *are merely illustrative of the principles of this invention and that various modifications may be implemented by those skilled in the art without departing from the scope and spirit of the invention.*
(Page 14, lines 13-16; emphasis added.)

Thus, the claimed invention is not limited to the exemplary problems and embodiments described in the specification. In the Advisory Action, the Examiner asserts that this statement supports the Examiner’s position. Appellants maintain that this statement was provided to indicate that there are a variety of statutory embodiments and domains for the invention.

Finally, regarding the Examiner’s assertion that the phrase “problem of discovering permutation patterns” introduces new matter, Applicants note that the cited phrase has been deleted. Applicants maintain that the deletion of the original phrase (“the abstract problem of discovering permutation patterns is formed as a discovery problem called the pattern problem”) does not and cannot introduce new matter and does not and cannot introduce problems, either abstract or from other domains. Moreover, Applicants note that the cited phrase is directed to the problem being solved and not to the solution or invention being claimed.

Thus, Applicants respectfully request that the objection under 35 U.S.C. §132(a) be withdrawn.

Section 112 Rejections

Claims 30-35 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Regarding claims 1, 20, and 29, the Examiner asserts that the term 'co-located element' is not defined or mentioned within the specification. 5 Regarding claims 31, 33, and 35, the Examiner notes that these claims recite that the relationship is functional, and asserts that there is no definition of "functional relationship" and that, using the excepted definition of a function, the relationship is not functional. Regarding claims 30, 32, and 34, the Examiner notes that these claims recite that the relationship is structural, and asserts that the word "structural" is not recited within the specification and is not a common term within the 10 art. The Examiner further asserts that "one of many possibilities of what 'structural' could be (is) an algorithm."

Regarding the Examiner's assertion that the term 'co-located element' is not defined or mentioned within the specification, Applicants note that "colocated" is defined as "to locate or be located in jointly or together." (See, dictionary.com) Thus, a person of ordinary 15 skill in the art would recognize that the term "co-located elements" are elements that are located jointly or together. In the Advisory Action, the Examiner asserts that the specification is silent regarding what the cited term means regarding the invention. A person of ordinary skill in the art would recognize, however, that the cited term is well known and refers to elements that are located jointly or together. In addition, claim 1, for example, requires processing co-located 20 elements discovered in said input string. The elements that are selected as co-located elements for processing are a design choice, as would be apparent to a person of ordinary skill in the art.

Applicants maintain that the terms "functional relationship" and "structural relationship" are well understood by a person of ordinary skill in the art. For example, the terms "structural" or "functional" are a rationale for looking at permutation patterns of, for instance, 25 genes or protein domains in amino acid sequences, i.e., genes that appear in a completely different order. These genes may have structural and/or functional relations, although they may appear in different orders in the chromosomes.

Regarding the Examiner's assertion that "one of many possibilities of what 'structural' could be (is) an algorithm," Applicants again note that the term "structural" is well 30 known: it is an adjective, and therefore *cannot* be an algorithm.

Regarding the Examiner's assertion in the Advisory Action that, if the Applicant uses FIGS. 3A-B to define 'structural,' then it is functional "due to the fact that each level is dependent on the lower level and only result can be obtained for a given lower level input."

Contrary to the Examiner's assertion, Applicants are *not* referring to FIGS. 3A or 3B in regard to the meaning of the term "structural relationship." As was argued above, the term "structural relationship" refers to the rationale for looking at permutations of, for example, genes or protein domains in amino acid sequences, in order to discover their structural relationships.

Thus, Applicants respectfully request that the section 112 rejections be withdrawn.

Section 101 Rejections

Claims 1-35 were rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. In particular, the Examiner asserts that the invention has not been limited to a substantial practical application and that the claims describe preemption. The Examiner asserts that the phrase "utilization in an application" means "utilization in any application" thus disclosing preemption and that "characters" are not limited to a specific application thus disclosing preemption.

In the Response to Arguments section of the present Office Action, the Examiner asserts that the statement "the existence of additional unknown uses for the invention has no relevance to the validity of the claims under section 101" is contrary to MPEP 2106 (emphasis added). In the Examiner's Answer dated August 3, 2007, the Examiner asserted that the claims fail to provide a tangible result, and notes that there must be a practical application. The Examiner asserted that 1) the Appellant admits to unknown uses for the invention; 2) relies on "Background" to supply a practical application of the invention; and 3) admits (in paragraph 0019) that the invention is an 'abstract problem.'

Regarding the Examiner's assertion that the statement is contrary to MPEP 2106, Applicants find no comments in MPEP 2106 regarding "unknown uses" for an invention *that are in addition to the disclosed uses of an invention*. Applicants note that any invention may have, in addition to the known uses, other unknown uses.

Regarding the Examiner's assertion that the Applicant admits to unknown uses for the invention, Applicants note that, as described below, the disclosure clearly identifies practical applications of the invention. The existence of additional unknown uses for the invention has no relevance to the validity of the claims under section 101. In addition, independent claims 1, 20, and 29 have been amended to require *providing said permutation patterns for utilization in an application that processes co-located elements discovered in said input string and that processes a relationship between groups of said characters identified by said permutation patterns*. Applicants maintain that this amendment limits the claims to a practical application.

Regarding the Examiner's assertion that the Applicant relies on "Background" to supply a practical application of the invention, please note that the specification has also been amended to include the practical application(s) (as disclosed in the "Background" section) in the "Detailed Description" section. Contrary to the Examiner's assertion, the cited amendment places the description of a gene analysis application in the Detailed Description section of the application and therefore provides guidance for an exemplary practical application of at least one aspect of the present invention. Furthermore, contrary to the Examiner's assertion, the cited amendment does *not* introduce new matter as the gene analysis application is clearly disclosed in the original application and is a domain to which the present invention is directed (see, page 2, lines 21-23, of the originally filed disclosure).

Regarding the Examiner's assertion that the Applicant admits (in paragraph 0019) that the invention is an 'abstract problem,' Applicants note that the term "abstract" was used in a technical sense, and *not* as a legal admission in the context of statutory subject matter, i.e., the term "abstract" is *not* a characterization of the invention that is claimed. Furthermore, the adjective "abstract" did *not* refer to the domains to which the discovery of permutation patterns is applied. In any case, the specification has been amended to delete the statement that "the problem of discovering permutation patterns is formed as a discovery problem called the pattern problem" in paragraph 0019. As noted above, Applicants maintain that the deletion of the cited phrase does not introduce new matter and does not and cannot introduce problems, either abstract or from other domains.

Regarding the Examiner's assertion that Applicant's argument that the "existence of additional unknown uses for an invention" is an admission of preemption, Applicants note that this is a general statement of fact that applies to all patent applications and is *not* an admission of preemption.

Regarding the Examiner's assertion that the statement that "genes that appear together consistently across genomes are believed to be functionally related" is evidence that the 'real world' application is based on 'belief' and not facts, Applicants note that the cited statement has led to new research and development in, for example, the analysis and identification of genes and, contrary to the Examiner's assertion, is evidence of a "real world" application.

Finally, as previously noted, the Supreme Court has stated that the "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to patentability of a process claim." *Gottshalk v. Benson*, 409 U.S. 63, 70, 175 U.S.P.Q. (BNA) 676 (1972). In other words, claims that require some kind of transformation of subject matter, which has been held to include intangible subject matter, such as data or signals, that are representative of or constitute physical activity or objects have been held to comply with Section 101. *See, for example, In re Warmerdam*, 31 U.S.P.Q.2d (BNA) 1754, 1759 n.5 (Fed. Cir. 1994) or *In re Schrader*, 22 F.3d 290, 295, 30 U.S.P.Q.2d (BNA) 1455, 1459 n.12 (Fed. Cir. 1994).

Thus, as expressly set forth in each of the independent claims, the claimed methods or system describe discovering permutation patterns from an input string having a plurality of characters, each character being from an alphabet, and transform the input string to permutation patterns. This transformation to permutation patterns provides a useful, concrete and tangible result. For example, the Background and Detailed Description sections of the present disclosure describe how such permutation patterns are utilized in medical applications related to genes and proteins. Thus, contrary to the Examiner's assertion that no function or application has been stated for the invention, Applicants note that the Background and Detailed Description sections of the present disclosure describe how such permutation patterns are utilized in medical applications related to genes and proteins (see, page 1, line 12, to page 2, line 20). The final result of the cited claims, i.e., permutation patterns, are useful, concrete and tangible results.

Regarding the Examiner's assertion that the claimed invention returns a number

that only has an abstract function. Applicants note that, as described numerous times above, the claimed invention transforms an input string to permutation pattern(s) that are, for example, utilized in medical applications related to genes and proteins.

In the Advisory Action, the Examiner in fact acknowledges that the disclosed invention transforms the input permutation. The Examiner asserts, however, that there is only a renaming of the input and no discovery of permutation patterns.

Contrary to the Examiner's assertion, the claimed method does more than simply rename the input string; it performs a transformation. For example, the steps of determining which, if any, names in a plurality of sets of names have changed by selection of the new portion; and using changes in the names to determine the permutation patterns in claim 1 are similar, in some respects, to an advanced type of hashing function. Thus, not only the disclosed invention, but also the claimed invention, transforms the input data.

Applicants submit that each of claims 1-35 are in full compliance with 35 U.S.C. §101, and accordingly, respectfully request that the rejection under 35 U.S.C. §101 be withdrawn.

Independent Claims 1, 20 and 29

Independent claims 1, 20, and 29 were rejected under 35 U.S.C. §102(b) as being anticipated by Floratos. Regarding claim 1, the Examiner asserts that Floratos teaches "using changes in the names to determine the permutation patterns" (page 457, C1: 26-43).

Applicants note that Floratos is directed to a different problem than the present disclosure. Floratos is directed to "identifying *sequence similarity* between a query sequence and a database of proteins." (Page 455, first paragraph; emphasis added.) Floratos searches for an *ordered sequence in a string*. The claims of the present disclosure are directed to *discovering permutation patterns*. As would be apparent to a person of ordinary skill in the art, permutation patterns indicate that the patterns are related to a *non-ordered set of characters*. For instance, dictionary.com teaches that the permutations of (1,2,3) are (1,2,3) (2,3,1) (3,1,2) (3,2,1) (1,3,2) (2,1,3). Independent claims 1, 20, and 29 require using changes in the names to determine the *permutation patterns*.

Regarding the Examiner's assertion that "a specific ordered sequence can be seen as a single input of a permutation pattern." Applicants note that a "sequence" is defined as "the

following of one thing after another.” (See, dictionary.com; emphasis added.) Thus, the example cited by the Examiner on page 26 of the present Office Action does *not* provide evidence that Floratos is directed to *discovering permutation patterns*.

Thus, Floratos does not disclose or suggest using changes in the names to determine the permutation patterns, as required by independent claims 1, 20, and 29.

Dependent Claims 2-19, 21-28 and 30-35

Dependent claims 2-17, 21-26, and 30-35 were rejected under 35 U.S.C. §102(b) as being anticipated by Floratos.

Claims 2-19 and 30-31, claims 21-28 and 32-33, and claims 34-35 are dependent on claims 1, 20, and 29, respectively, and are therefore patentably distinguished over Floratos because of their dependency from independent claims 1, 20, and 29 for the reasons set forth above, as well as other elements these claims add in combination to their base claim.

All of the pending claims, i.e., claims 1-35, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number indicated below.

The Examiner's attention to this matter is appreciated.

Respectfully submitted,

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